## This Page Is Inserted by IFW Operations and is not a part of the Official Record

## BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

## IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents will not correct images, please do not report the images to the Image Problem Mailbox.

## WHAT IS CLAIMED:

Spi

5

10

15

20

30

35

1. A method for operating an alternator of a motor vehicle, comprising:

monitoring an amount of stored electrical energy available to operate the vehicle;

estimating a vehicle electrical load; and regulating an output of the alternator based at least in part on the amount of electrical energy available to the vehicle and the estimated electrical load of the vehicle.

2. The method according to claim 1, further comprising the steps of:

monitoring operation of vehicle electrical components; and

estimating the vehicle electrical load based on the operation of the vehicle components.

3. The method according to claim 1, further comprising the steps of:

deriving a schedule of operation of vehicle electrical components; and

estimating the vehicle electrical load based on the scheduled operation of the vehicle components.

A. The method according to claim 1, wherein said monitoring step comprises the step of monitoring a battery state of charge.

The method according to claim A, wherein said regulating step comprises selecting an alternator setpoint voltage based on at least in part on the battery state of charge and the estimated vehicle electrical load.

5
S. The method according to claim S, wherein said step of selecting an alternator voltage comprises:

10

15

20

25

30

35

deriving a plurality of voltage regulation classifications; and

selecting one of a plurality of voltage regulation strategies corresponding to the voltage regulation classifications.

- The method according to claim  $\beta$ , further comprising the step of providing a battery temperature, and further wherein each of the voltage regulation strategies are a function of battery temperature.
- %. The method according to claim %, further comprising the steps of:

monitoring operation of critical vehicle loads; and selecting one of said voltage regulation strategies based at least in part on the operation of the critical vehicle loads.

%. The method according to claim %, further comprising the step of selecting a setpoint transition strategy to transition operation between the voltage regulation strategies.

10. A method for operating an alternator of a motor vehicle having a battery coupled to the alternator for storing electrical energy, comprising:

monitoring a battery state of charge;
monitoring operation of vehicle electrical
components;

estimating a vehicle electrical load based on the operation of the vehicle components; and

regulating an output of the alternator based at least in part on the battery state of charge and the estimated vehicle electrical load.

11. The method according to claim 10, wherein said regulating step comprises selecting an alternator setpoint voltage based at least in part on the battery

- 13 -

10

15

20

25

35

state of charge and the estimated vehicle electrical load.

12. The method according to claim 11, wherein said step of selecting an alternator voltage comprises:

deriving a plurality of voltage regulation classifications; and

selecting one of a plurality of voltage regulation strategies corresponding to the voltage regulation classifications.

The method according to claim 12, further comprising the step of providing a battery temperature, and further wherein each of the voltage regulation strategies are a function of battery temperature.

14. The method according to claim 12, further comprising the steps of:

monitoring operation of critical vehicle loads; and selecting one of said voltage regulation strategies based at least in part on the operation of the critical vehicle loads.

15. The method according to claim 12, further comprising the step of selecting a setpoint transition strategy to transition operation between the voltage regulation strategies.

16. A system for operating an alternator of a motor vehicle, comprising:

a first monitor for indicating an amount of stored electrical energy available to operate the vehicle;

a second monitor for indicating operation of vehicle electrical components; and

a controller coupled to the first and second monitors for estimating a vehicle electrical load based on operation of vehicle electrical components and for regulating an output of the of the alternator based at least in part on the indicated amount of stored

5 lbn > 30



15

20

25

35

electrical energy and the estimated vehicle electrical load.

The system according to claim 16, wherein said first monitor comprises a battery state of charge monitor.

18. The system according to claim 16, wherein said second monitor comprises means coupled to the vehicle electrical components for communicating information indicative of vehicle electrical load.

The system according to claim 16, wherein said controller comprises:

means for monitoring operation of the vehicle electrical components; and

means for estimating the vehicle electrical load based on the operation of the vehicle components.

20. The system according to claim 16, wherein said controller comprises:

means for deriving a schedule of operation of the vehicle electrical components; and

means for estimating the vehicle electrical load based on the scheduled operation of the vehicle components

21. The system according to claim 16, wherein said controller comprises means for selecting an alternator setpoint voltage based on the battery state of charge and the estimated vehicle electrical load.

22. The system according to claim 21, wherein said controller comprises:

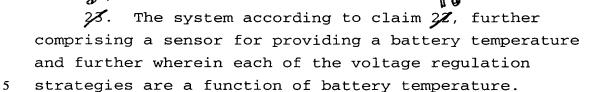
means for deriving a plurality of voltage regulation classifications; and

means for selecting one of a plurality of voltage regulation strategies corresponding to the voltage regulation classifications.

6 N 30

15

20



- 24. An article of manufacture for operating an alternator of a motor vehicle having a battery coupled to the alternator for storing electrical energy, said article of manufacturing comprising:
  - a computer usable medium, and

a computer readable program code embodied in the computer usable medium for directing a computer to control the steps of monitoring a battery state of charge, monitoring operation of vehicle electrical components, estimating a vehicle electrical load based on the operation of the vehicle components; and regulating an output of the alternator based at least in part on the battery state of charge and the estimated vehicle electrical load.

op of the second